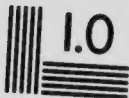


# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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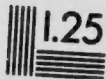
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REPORT

ON THE

PRESENT AND PROSPECTIVE OUTPUT OF THE MINES

OF THE

SILVER-COBALT ORES OF THE  
COBALT DISTRICT

BY

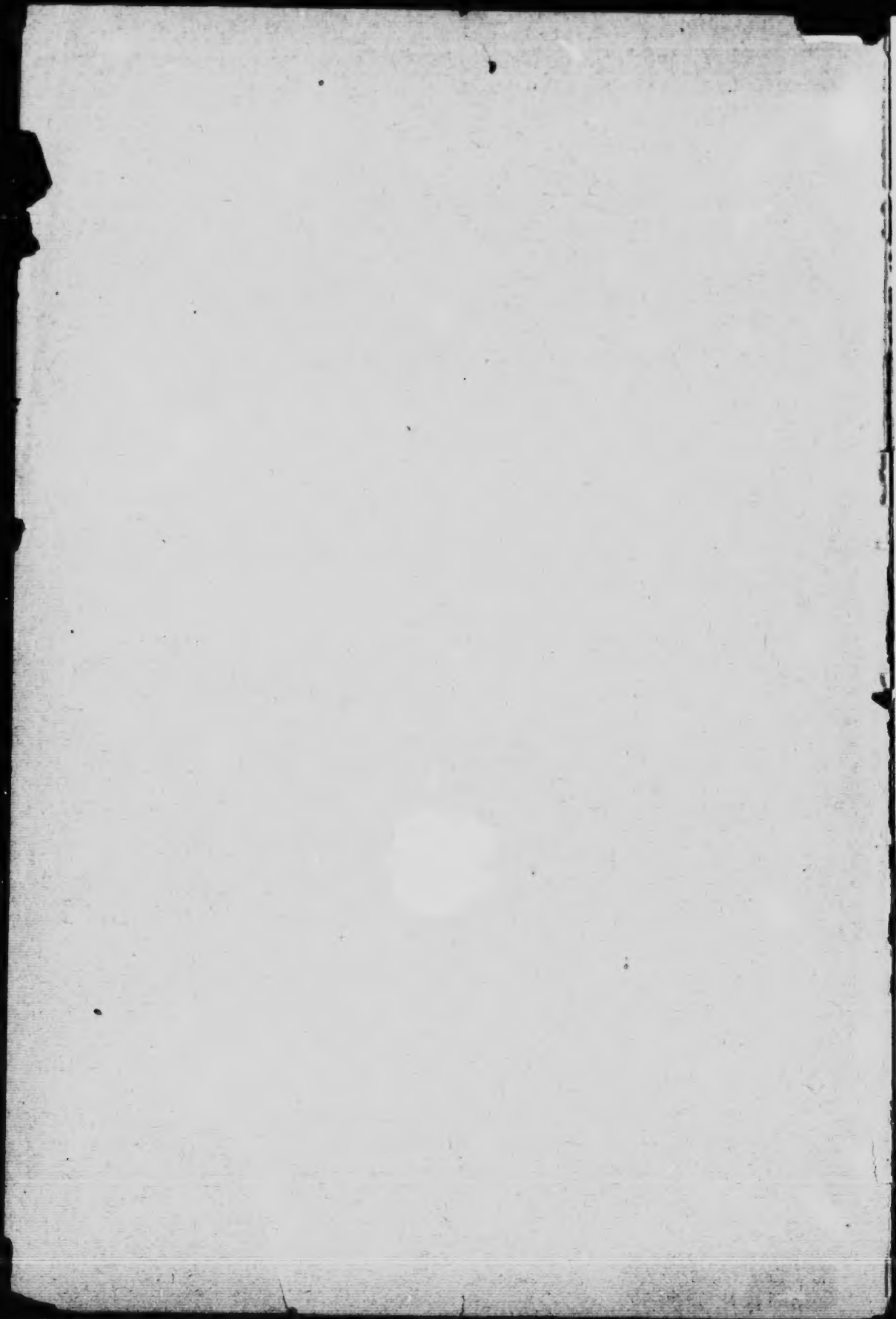
EUGENE HAANEL, Ph.D.

*Superintendent of Mines*

OTTAWA

GOVERNMENT PRINTING BUREAU

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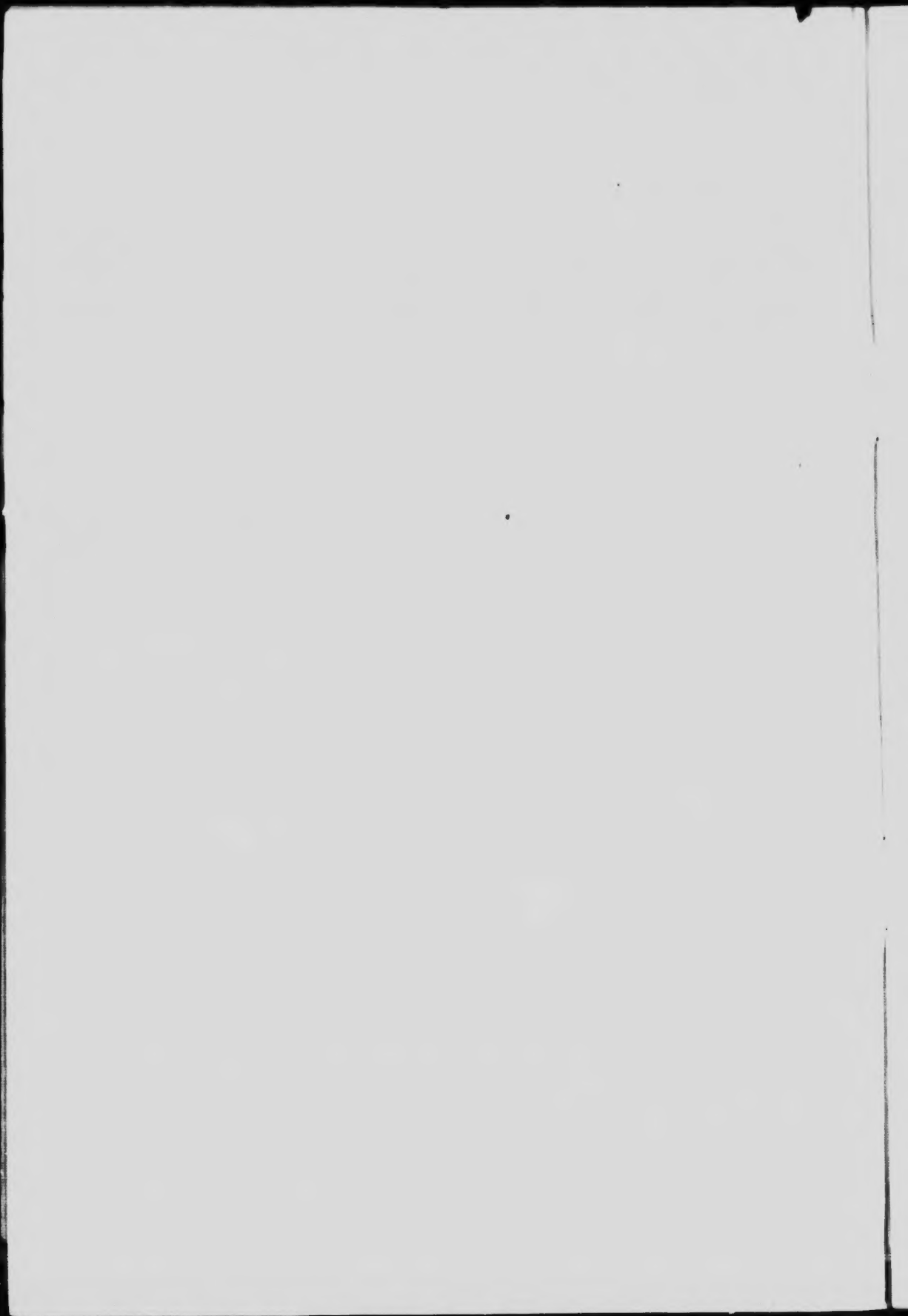
BY

EUGENE HAANEL, Ph.D.

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OTTAWA  
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1907



DEPARTMENT OF THE INTERIOR,

MINES BRANCH,

OTTAWA, December 28, 1906.

SIR,—I have the honour to submit herewith report on the present and prospective output of the mines of the silver-cobalt ores of the Cobalt district. The statement of prospective output is, from the nature of the case, only an approximation.

Although every effort was made, nothing could be learned regarding details of the process employed for the extraction of metals by the different smelting companies to which the silver-cobalt ores are shipped, nor was it possible to obtain from them an estimate of the cost of operations.

I have the honour to be, sir,

Your obedient servant,

EUGENE HAANEL,

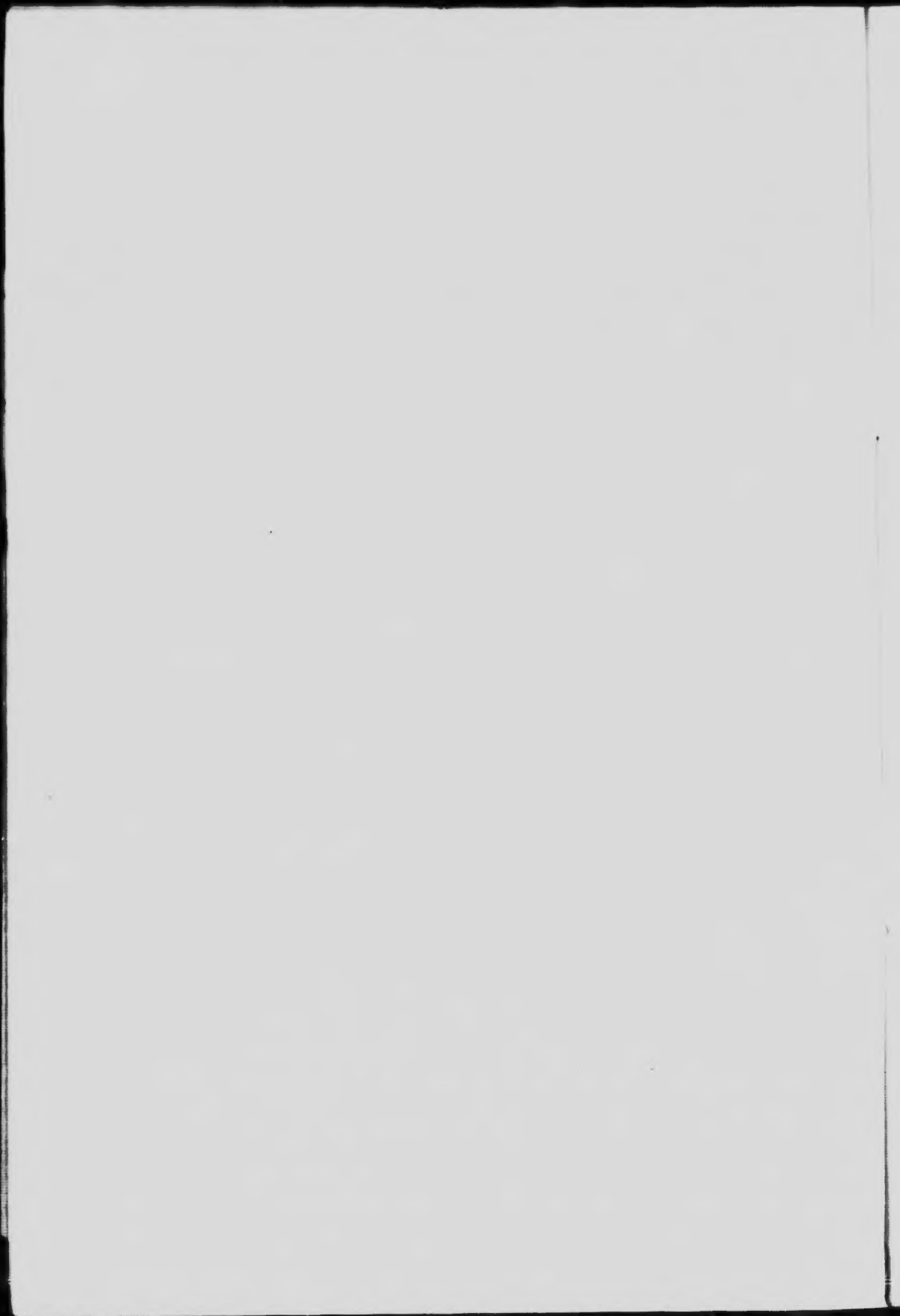
*Superintendent of Mines.*

Hon. FRANK OLIVER, P.C., M.P.,

Minister of the Interior,

Department of the Interior,

Ottawa.



OTTAWA, December 28, 1906.

In accordance with your instructions of November 28, to proceed to Cobalt and prepare a report showing the present and prospective output of the mines in that locality, the report to contain also a statement as to the methods by which the metals are extracted from the ore and the cost of the operations involved, I proceeded at once to Cobalt, where I visited all the important shipping mines for the purpose of obtaining the required information regarding output.

The following is a statement of the quantity of ore shipped, obtained from the records of the railroad company at Cobalt, and the notes taken at the different mines of the prospective shipments for the year 1907 :—

**SHIPPING RECEIPTS OBTAINED FROM TEMISKAMING AND NORTHERN ONTARIO RAILROAD, COBALT STATION.**

*Larose.*

	Lb.	Tons.
January, to Bergen Jet. . . . .	40,000	
February, to Bergen Jet. . . . .	30,000	
March, to Bergen Jet. . . . .	128,620	
May, to New York. . . . .	126,000	
June, to New York. . . . .	109,700	
June, to Hamilton. . . . .	40,000	
July, to Newark. . . . .	122,600	
July, to New York. . . . .	59,400	
August, to Hamilton. . . . .	43,000	
September, to New York. . . . .	56,000	
September, to Bergen Jet. . . . .	130,000	
October, to Bergen Jet. . . . .	43,000	
October, to New York. . . . .	53,800	
November, to New York. . . . .	495,000	
	<hr/> 1,476,920=	738.46

*Star Silver Cliff Mining Co.—(Now the Nova Scotia).*

	Lb.	Tons.
July, to New York. . . . .	40,860	
November, to New York. . . . .	47,040	
	<hr/> 87,900=	43.95

*Silver Queen.*

	Lb.	Tons.
July, to Newark. . . . .	60,170	
October, to Newark. . . . .	87,630	
October, to New York. . . . .	98,340	
	<hr/> 246,140=	123.07



*Nipissing.*

	Lb.	Tons.
January, to Copper Cliff. . . . .	642,320	
February, to New York. . . . .	38,180	
March, to New York. . . . .	180,000	
March, to Bergen Jct. . . . .	60,000	
April, to New York. . . . .	169,600	
May, to New York. . . . .	313,100	
June, to New York. . . . .	42,740	
July, to New York. . . . .	85,470	
August, to New York. . . . .	272,720	
September, to New York. . . . .	424,240	
September, to Bergen Jct. . . . .	57,750	
October, to New York. . . . .	970,830	
November, to New York. . . . .	199,715	
	<hr/> 3,456,665	<hr/> = 1,728.33

*Tretheway, J. B. VII.*

	Lb.	Tons.
March, to Bergen Jct. . . . .	60,000	
August, to Bergen Jct. . . . .	58,200	
August, to Perth Amboy. . . . .	53,400	
September, to Bergen Jct. . . . .	58,000	
October, to Bergen Jct. . . . .	180,000	
October, to Perth Amboy. . . . .	216,000	
November, to Perth Amboy. . . . .	106,770	
	<hr/> 732,370	<hr/> = 366.33

*Foster.*

	Lb.	Tons.
October, to Bergen Jct. . . . .	127,000	
November, to Bergen Jct. . . . .	47,000	
	<hr/> 174,000	<hr/> = 87.00

*Kerr Lake.*

	Lb.	Tons.
January, to New York. . . . .	41,400	
March, to Bergen Jct. . . . .	60,000	
July, to Bergen Jct. . . . .	56,000	
September, to Bergen Jct. . . . .	85,000	
	<hr/> 242,400	<hr/> = 121.20

*Coniagas.*

	Lb.	Tons.
November, to Perth Amboy. . . . .	180,000	
November, to Bergen Jct. . . . .	60,000	
	<hr/> 240,000	<hr/> = 120.00

*Buffalo.*

	Lb.	Tons.
February, to Bergen Jet. . . . .	40,100	
March, to Bergen Jet. . . . .	40,000	
March, to Jersey City. . . . .	63,000	
May, to Jersey City. . . . .	355,900	
June, to Perth Amboy. . . . .	141,500	
June, to Jersey City. . . . .	60,000	
July, to Jersey City. . . . .	120,000	
July, to Perth Amboy. . . . .	44,900	
July, to Copper Cliff. . . . .	175,800	
August, to Copper Cliff. . . . .	45,600	
August, to Jersey City. . . . .	60,000	
September, to Chrome, N.Y. . . . .	100,000	
September, to Copper Cliff. . . . .	38,800	
September, to Jersey City. . . . .	60,000	
October, to Perth Amboy. . . . .	120,000	
October, to Jersey City. . . . .	80,000	
November, to Perth Amboy. . . . .	280,000	
	<hr/> 1,825,600=	912.30

*Violet.*

	Lb.	Tons.
September, to New York. . . . .	40,000=	20.00

*University.*

	Lb.	Tons.
January, to Newark. . . . .	40,000	
February, to Bergen Junction. . . . .	40,300	
March, to Bergen Junction. . . . .	52,000	
April, to Bergen Junction. . . . .	60,000	
September, to Bergen Junction. . . . .	63,250	
October, to Bergen Junction. . . . .	45,000	
	<hr/> 310,550=	155.27

*McKinley-Darragh Savage.*

	Lb.	Tons.
July, to Copper Cliff.*. . . . .	54,000	
October, to New York. . . . .	60,000	
	<hr/> 114,000=	57.00

*Drummond.*

	Lb.	Tons.
April, to Copper Cliff. . . . .	44,800	
June, to Copper Cliff. . . . .	85,300	
December, to Copper Cliff. . . . .	80,000	
	<hr/> 210,100=	105.05

*Green & Meehan.*

	Lb.	Tons.
November, to Bergen Junction.. . . . .	34,050=	17·03

*L. Downey.*

February, to Bergen Junction.. . . . .	46,900=	23·45
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*Colonial*

	Lb.	Tons.
February, to Bergen Junction.. . . . .	30,000=	15·00

*Bailey.*

	Lb.	Tons.
October, to Bergen Junction.. . . . .	60,000=	30·00
		4,663·44

\*Tonnage approximate.

*Larose Mine.*—Information regarding prospective output for the year 1907 was not obtained, but it may be assumed that shipment will be at the same rate as heretofore.

*The Nova Scotia Cobalt Mining Company*, formerly *Star Silver Cliff Mining Company*, have shipped so far 43 tons—9 tons No. 1 grade and 34 tons No. 2 grade. All shipments have been made to Perth Amboy, New Jersey. This company expects to ship two cars for the next six months, which is expected to be recovered during the development mapped out. For the remainder of the year they expect to ship about 3 car-loads every 2 months, or 9 cars for the remaining 6 months of the year, making a total of 11 cars, at 25 tons a car.

*Cobalt Silver Queen, Ltd.*, shipped 123·07 tons. Information regarding prospective shipments for the ensuing year could not be obtained.

*Kerr Lake Mining Company* shipped 121·2 tons to *Ledoux & Company*, New Jersey, for sampling, and then to the *American Smelting and Refining Company*, Perth Amboy, N.J., who pay 95 per cent for silver values and nothing for cobalt. So far this ore has been poor in cobalt, but now the cobalt values are increasing and it is proposed to ship to the *Orford Company*, Copper Cliff, Ont. This company is installing new machinery and expects to ship 2 car-loads a month, of 25 tons a car-load. This will be rich ore. They now have on hand about 2 car-loads of lower grade.

*Coniagas Mine* shipped from November 29, 1905, to November 17, 1906, 208 tons. All shipments were made to the *American Smelting and Refining Company*, Perth Amboy Plant, Mauser, N.J. There is also on the way:—

80 tons of high grade ore.

110 tons of low grade ore.

Prospective shipments: 2 car-loads a month, of first grade ore, of about 28 tons per car load. Two car-loads a month, of 28 tons, second grade ore. Total: 1,34½ tons.

*Buffalo Mines, Ltd.*, shipped from May 8 to November 30, 920 tons. Prospective shipments are expected to be at the same rate.

*Nipissing Mining Co., Ltd.*, shipped from the fall of 1904 to November 22, 1906, 1,565·13 tons. Prospective shipments during 1907, 10 to 15 car-loads (25 tons a car-load) per month. Total, 3,600 tons. Ore is to be taken from about 33 veins of the 56 veins so far opened. Cobalt in first grade ore runs about 7 per cent, nickel 3 per cent and arsenic 35 per cent.

*J. B. VII.*—This mine shipped from March to November, 1906, 366.18 tons. Prospective shipments, 1 car-load a week or 4 a month, 4 No. 1 grade and 3 No. 2 grade. Total, 1,344 tons.

This mine has been under new management for the past three weeks and has not shipped during this period.

*Foster Mine* has shipped 3 car-loads, or 87 tons. These 3 car-loads were shipped to Ledoux & Co., for sampling and then to the American Smelting and Refining Co., Perth Amboy, N.J. Prospective shipments, 1 car-load a month. Total, 300 tons.

*Bailey Mine* has shipped 30 tons. Prospective shipments for 1907, 30 tons.

*Violet Mine* shipped in September 10 tons. No estimate of prospective shipments for 1907 obtained.

*University Mines, Ltd.*, shipped 155.27 tons from January to October, 1906.

October, 1906—

September 3, 63,200 lbs., 27,600 No. 1, 35,600 No. 2.

September 12, 58,000 lbs., smaltite ore.

October 12, 45,500 lbs., No. 2 ore.

Smaltite is worth \$100 per ton. All of above shipments, i.e., from September 3 to October 12, were sent to Ledoux & Co., for sampling. Prospective shipments, 1 car-load a month, of about 30 tons. Total, 366 tons.

*Drummond Mines, Ltd.*, have shipped, from April to September, 1906, 105 tons. All shipments were made to the Orford Copper Co., Copper Cliff. Prospective shipment, 30 tons per month. Total, 360 tons.

*The Green & Meehan* shipped 17 tons to Bergen Junction. Prospective shipments for 1907, 80 tons.

*The Colonial Mining Company* has not yet shipped ore, but have two car-loads in stock ready for shipment. 17 veins have so far been discovered on the property and 3 veins have been opened up. The expectation is that with the machinery put in, which will be installed by January 1, they will be able to ship 5 car-loads a month.

*Silver Cliff Mining Co.* have ready for shipment one car, which will represent the first shipment. The line of development mapped out is expected to be complete in about 3 months, when the prospective future shipments are expected to be two cars of 25 tons each, per month. Total, 600 tons.

*Gillies Limit.*—The Ontario government will likely ship from the Gillies Limit during 1907, 4 cars of 30 tons each. Total, 120 tons.

*The Right of Way Mining Company* have two car-loads ready for shipment, of 30 tons each. Prospective shipment, 4 car-loads for next season. Total, 120 tons.

*Cobalt Townsite Mining Company* have one car ready for shipment, of 25 tons. Still under development and likely to ship four car-load, next year.

*Red Rock Mine.*—There have been no shipments from this mine. Prospective shipments, total, 40 tons.

*King Edward Mining Company* is at present developing and expects to ship in the near future. No estimate could be obtained as to the probable tonnage of output for next season.

*The Silver Bar Mining Co.* has made no shipments.

*The O'Brien Mine*, at present in litigation, is expected to become a large shipper.

## PROSPECTIVE SHIPMENTS FOR 1907.\* FOR 12 MONTHS.

Mine.	Tons.
Larose. . . . .	738·00
Nova Scotia. . . . .	275·00
Cobalt Silver Queen. . . . .	†
Kerr Lake Mining Co. . . . .	600·00
Coniagas. . . . .	1,344·00
Buffalo Mines, Ltd. . . . .	480·00
Nipissing Mining Co. . . . .	3,600·00
J. B. VII. . . . .	1,344·00
Foster. . . . .	300·00
Bailey. . . . .	30·00
Violet. . . . .	‡
University. . . . .	336·00
McKinley-Darragh-Savage. . . . .	†
Drummond. . . . .	336·00
Green & Meehan. . . . .	†
L. Downey. . . . .	†
Colonial. . . . .	1,680·00
Silver Cliff Mining Co. . . . .	600·00
Gillies' Limit. . . . .	120·00
Right-of-Way Mining Co. . . . .	120·00
Cobalt-Townsite Mining Co. . . . .	100·00

Total. . . . . 12,003·00

Approximate value. . . . . \$12,530,152.00

\* The amount of the prospective shipments for the year 1907 will be materially increased by the shipment from some of the mines now under development and the removal of embargo on mines now in litigation.

† Information of prospective tonnage could not be obtained.

‡ No prospective shipments.

## SUMMARY OF ORE SHIPPED, AS OBTAINED FROM MANAGERS OF MINES.

Mine and Date.	Tons.
Larose, Jan.-Nov., 1906. . . . .	738·46
Nova Scotia, July-Nov., 1906. . . . .	43·00
Cobalt Silver Queen. . . . .	123·07
Kerr Lake Mining Co. . . . .	121·20
Coniagas, Nov. 29, 1905 to Nov. 17, 1906. . . . .	208·00
Buffalo Mines, Ltd, May 8, 1906, to Nov. 30, 1906. . . . .	920·00
Nipissing Mining Co., 1904 to Nov. 22, 1906. . . . .	1,565·13*
J. B. VII., March-Nov., 1906. . . . .	366·18
Foster, Oct.-Nov., 1906. . . . .	87·00
Bailey, Oct., 1906. . . . .	30·00
Violet, Sept., 1906. . . . .	10·00
University, Jan.-Oct., 1906. . . . .	155·27
McKinley-Darragh-Savage, July-Oct., 1906. . . . .	57·00†
Drummond, April-September, 1906. . . . .	105·05
Green & Meehan, November, 1906. . . . .	17·03
L. Downey, February, 1906. . . . .	23·45
Colonial, February, 1906. . . . .	15·00

4,584·84

Approximate value. . . . . \$4,283,369.02

\* Tonnage shipped to correspond with data furnished by the manager. Value, \$2,046,336.95.

† Approximate.

The discrepancy between the railroad returns of ore shipped and the statement of ore shipped obtained from the mine managers is due to the fact that railroad shipments include all ore shipped from January to November, 1906, whereas the statements received from the mine managers in some cases include all shipment of ore since the beginning of operations, while in other cases the shipments are given for a few months only.

#### SMELTERS TO WHICH COBALT-SILVER ORES ARE SHIPPED AND TERMS ON WHICH ORE IS RECEIVED FOR TREATMENT.

I found on investigation that the ore from the Cobalt district was shipped to three firms:—

The American Smelting and Refining Company, who have their Smelting Works at Perth Amboy, New Jersey, with head office at 71 Broadway, New York.

The Balbach Smelting and Refining Company at Newark, New Jersey.

The Orford Copper Company at Copper Cliff, Ont., with head office at 43 Exchange Place, New York.

In order to obtain the information regarding the processes employed and cost of operations of extracting the metal from the ore, I visited the smelting works and head offices of the first two named smelting companies and the head office of the Orford Copper Company in New York city.

The American Smelting and Refining Company and the Balbach Smelting and Refining Company have no process for saving cobalt, nickel or arsenic contents of the ore. They are both extensive lead smelters and the process employed for saving the silvers contents is to use the lead ores as a collector. No detailed description of the process was obtainable, nor could anything be learned regarding costs of extraction.

The following are the terms on which they receive and treat the ores from the Cobalt district:—

##### THE AMERICAN SMELTING AND REFINING COMPANY.

Silver: Pay for 94 per cent of contents at New York quotations as given on date of assay settlement by Messrs. Handy and Harman to Western Union Telegraph Company.

Treatment charge: \$10 per ton of 2,000 pounds of ore, dry weight.

Payment: Cash immediately on agreement of assays.

The above terms are f.o.b. cars in the yard of their works at Perth Amboy, N.J.

Cars may be stopped and ore sampled in transit by Messrs. Ledoux & Co., whose sampling will be accepted as a basis of settlement, if given opportunity to have a representative of the company present during the process. Weights to govern would be those of the Perth Amboy Plant.

The American Smelting and Refining Company do not pay for cobalt contents, as in their processes they are unable to recover this element.

The Balbach Smelting and Refining Company receive silver ore, if not too high in arsenic, upon the following terms:—

Ore ruling 400 oz. silver per ton, smelting charge \$6 per ton.

Above 400 to 500 oz. silver per ton, smelting charge \$5 per ton.

Above 500 to 600 oz. silver per ton, smelting charge \$4 per ton.

Above 600 to 700 oz. silver per ton, smelting charge, \$3 per ton.

Above 700 to 800 oz. silver per ton, smelting charge, \$2 per ton.

Above 800 oz. silver per ton, no smelting charge.

They pay for 93 per cent of the silver contents of the ore at the New York market price for silver ruling on the day of agreement of assays. Settlement, 14 days after agreement of assays, or cash less 1 per cent.

If settlement is based on assays of Ledoux & Co., weights and moisture as found in their works in the presence of Ledoux & Company's representative are to be taken as

the silver is to be paid for at the New York market price for silver ruling on the day of issue of Ledoux & Company's assay certificate, showing weights and moisture as found in the works of the Balbach Smelting and Refining Company. Settlement, 14 days after date of such certificate, or cash less 1 per cent.

This company does not pay for the cobalt in the material.

*The Oxford Copper Company* pay for both silver and cobalt, but not for the nickel and arsenic contents. My request for a description of their process was placed by their metallurgist, Mr. Johnson, before the board of directors, but they refused to give any description whatever of the process employed or to permit me to see the works where these ores are treated.

At present the ores treated by them are shipped to Copper Cliff, Ont., where the ores are smelted, resulting in a partial silver recovery and a high silver-bearing speiss, which is shipped to Camden, N.J., for further treatment.

The following are the terms on which they receive for treatment cobalt-bearing silver ores :—

				Oz. silver and over.
Payment for 94 p.c. of silver per ton of ore (2,000 lbs.) carrying..				4,000
" 93	"	"	"	1,200
" 92	"	"	"	800
" 90	"	"	"	500
" 85	"	"	"	300
" 80	"	"	"	150

\$30 per ton of ore (2,000 lb.) containing 12 p.c. cobalt and over.

\$20 per ton of ore (2,000 lb.) containing 8 p.c. cobalt and over.

\$10 per ton of ore (2,000 lb.) containing 6 p.c. cobalt and over.

Ores to be delivered f.o.b. cars at their smelter, Copper Cliff, Ont., sampling to be done by the company at Copper Cliff, seller's representative or Ledoux & Company's representative acting for seller to be present, assays upon which ore is to be purchased and payment made to be made at seller's expense by Ledoux & Company, New York city, terms of payment for silver to be at the New York official rate for silver upon the day of completion of sampling at Copper Cliff, payment for silver and cobalt to be made thirty days after date of completion of sampling. No payment will be made for any metals other than cobalt and silver. The company does not care to purchase ores in which the nickel contents are higher than the cobalt contents.

#### NORTH AMERICAN COBALT REFINING COMPANY OF HAMILTON.

Mr. Black, secretary of this company, states that some of the principal mine owners of the Cobalt district have formed a company with a capital of one million dollars. \$50,000 of stock have been subscribed for the erection of an experimental plant in Hamilton, where they own 5½ acres. Experiments have been conducted in the treatment of the complex cobalt ores by Mr. R. L. Peake of Ledoux & Company, who is said to have discovered a satisfactory process which has been checked and favourably reported upon by Mr. Hersey of Montreal. It is the intention of the company to erect smelters for the exploitation of this process in the treatment of the cobalt ores at Hamilton.

*The Anglo French Nickel Company, Ltd.*, of Swansea, South Wales, have made application for cobalt ores, for the purpose of making an experimental investigation of these ores, with the view of deriving full values of their contents. The conditions they offer are as follows :—

- (1) That 2½ tons of ore be sent forward at once.

(2) The experiments to be made at the Swansea works and the net return, deducting cost of re-raction, will be held to the order of the senders of the ore.

(3) Such cost not to include any cost of outlay for plant, but to be only the cost of labour and materials used.

(4) Should any of the ore not be treated, it will be held to the order of the senders.

(5) A careful metal account will be kept and the company will not be held accountable for any difference between the contents of the ore treated and the products shown by the result of such treatment.

The works will give full return for silver, cobalt, nickel, arsenic and any other metals that may be found within the ore.